Joint Informational Hearing of the

Senate Subcommittee on Gas, Electric and Transportation Safety

Jerry Hill, Chair

and the

Assembly Committee on Accountability and Administrative Review

Rudy Salas, Chair

December 17, 2015

DANGEROUS DIGS:

WHY DO FATAL PIPELINE ACCIDENTS PERSIST?

Contact of excavation equipment with underground infrastructure is one of the most common sources of natural gas and petroleum pipeline accidents. A nationwide system of "one-call" centers exists so that excavators can dial 811 and have owners of gas, petroleum, electricity, water, sewer, and telecommunications utilities mark underground lines so that the excavator can dig without striking them. Recent fatal accidents, such as that on November 13, 2015 just south of Bakersfield, highlight how using this system, while necessary for safe excavation, is not sufficient to prevent serious injury. This hearing will explore how excavation can go wrong and what excavators and utilities need to do to protect workers and the public.

Danger Below

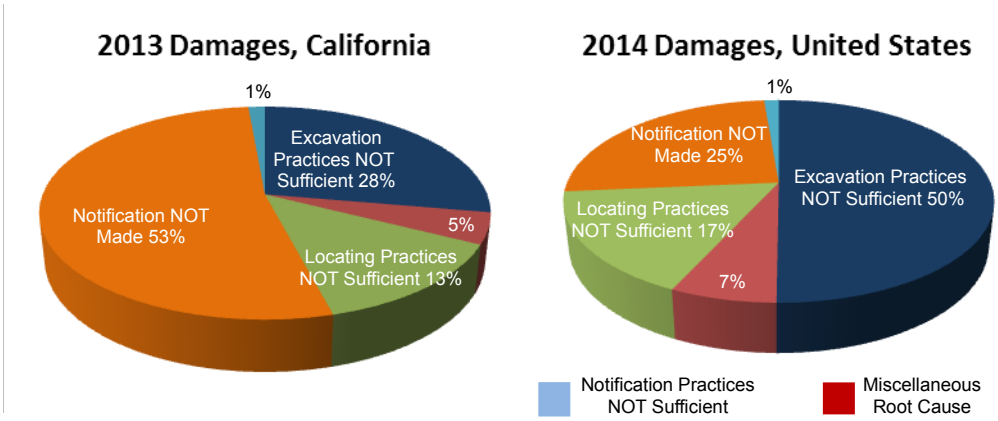
Much of California's energy travels through underground pipelines. In addition to heating fuel delivered directly to homes and businesses, about 41% California's electricity, which is delivered primarily through overhead power lines, is generated from natural gas traveling unseen in underground high pressure steel pipelines to electric generating plants across the western United States.[1] Pipeline transportation is also the second-leading source of crude oil, after marine vessels, delivered to California's refineries.[2] Nationwide, excavation damage is the leading cause of death or serious injury from natural gas and petroleum pipelines. After fatal "dig-in" incidents in Fresno and Bakersfield this year, California has the ignominious distinction of having the country's two most recent dig-in fatalities.

The first step to preventing unsafe contact with underground utilities is for excavators to notify the one-call center of intent to dig by either calling the nationwide 811 number or entering the request

[1] California Energy Commission, "California electrical energy generation: Total Production, by resource type," http://energyalmanac.ca.gov/electricity/electricity_generation.html Accessed December 10, 2015.

[2] California Energy Commission, "California Transportation Fuel Overview and & Changing Crude Oil Trends," October 7, 2014. http://www.slc.ca.gov/About/Prevention_First/PF2014/3B_Schremp.pdf

electronically via the internet. In California, notification is required by law for almost everyone, as is utility marking of lines within two days of the notification. The Common Ground Alliance (CGA), a national membership organization organized to bring together excavation stakeholders to reduce damage to underground infrastructure, collects damage data from across the country, including more than 270,000 submissions in 2014. They estimate that, when the 811 service is used, there is less than a 1% chance of damaging an underground facility.[3] California-specific data supplied by CGA indicates that, despite few statutory notification exemptions, failure to call 811 is a disproportionally greater source of damages in California than in other parts of the country, as can be demonstrated in the following figure.[4]



Source: United States data from Common Ground Alliance *DIRT Annual Report for 2014*. http://www.cga-dirt.com/annual/
California data submitted by Common Ground Alliance.

Despite the importance of making the 811 notification, three of the last four fatal accidents in California occurred after a notification had been made and responded to by the operator.

Of the 50% of nationwide damages submitted to CGA that were attributed to inadequate excavation practices, the vast majority of submissions did not specify how the practices were insufficient. In order to explore the question of what goes wrong even when the call to 811 has been made, this hearing relies not on risk factor data but on an examination of the conditions found in accidents with fatal consequences and looks at California-specific incidents and fatality data reported to the federal Pipeline and Hazardous Materials Safety Administration (PHMSA).

California's Last Four Fatal Incidents

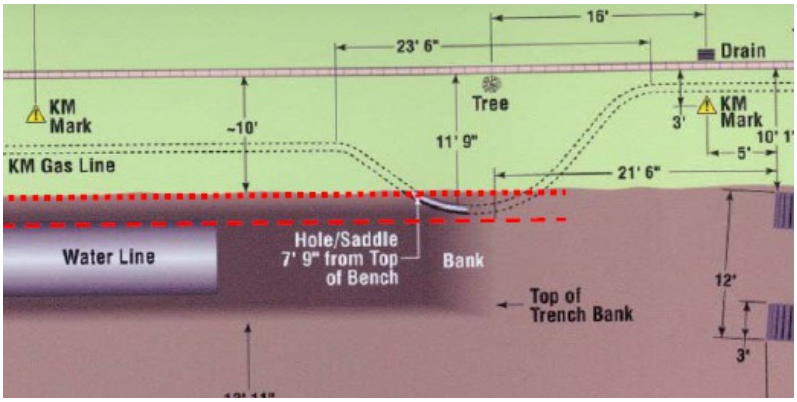
Walnut Creek, Tuesday, November 9, 2004:[5] Mountain Cascade, under contract with East Bay Municipal Utility District, was in the process of digging a trench for a 72-inch water pipeline along South Broadway.

[3] Common Ground Alliance, *DIRT Annual Report for 2014*, August 11, 2015, p. 7. http://www.cga-dirt.com/annual/

[4] It should be noted that submission of damage data is voluntary, and in the year 2013, 96% of the 5,082 submissions to California's DIRT project were from natural gas operators.

Kinder Morgan owned a 10-inch high pressure gasoline pipeline along the water pipeline project, and company employees marked the approximate location of the line. The company did not, however, note the presence of a bend, or "offset," in the line in its field marks. The offset had been installed to go around a large oak tree—a tree which no longer stood in the area. Mountain Cascade did not identify the bend, and at 1:22pm the bucket from one of its excavators struck the line, causing gasoline to stream into the surrounding area. Several seconds later, the gasoline was ignited by welders working on the water line project, and the resulting explosion and fire killed five workers and severely injured another four.

The Office of the State Fire Marshall found that Kinder Morgan did not effectively mark its pipeline, but also noted that maps identifying the offset had previously given to Mountain Cascade, which should have triggered the need to identify the exact location of the line before excavating with mechanical tools.



Paso Robles, Friday, October 2, 2008: [6] Not all fatal dig-ins are a result of contact with gas or petroleum infrastructure, though there is no state or federal agency that keeps track of these accidents. Tiechert Construction was installing a 30-inch water pipe for San Luis Obispo County's Nacimiento Water Project at the intersection of Niblick Road and South River Road. Jake Gaines, 24, of Bakersfield and Manuel Villagomez, 48, or Elk Grove were inside the pipe removing wooden pipe supports when the bucket of an excavator digging ahead of them struck an 8-inch city water line, filling the trench and the pipe with water, forcing the two men down the pipe where they drowned.

Earlier, Paso Robles's water department determined that it could not mark the water line, as traffic in the intersection was too heavy, and so the city provided Teichert the maps instead. On the evening of the accident, one supervisor told the operator of the excavator to stop while the location of the line was determined. Subsequently another supervisor, reading his map upside down, told the operator of the excavator to start again, which led to the accident a few minutes later.

[5] Office of the State Fire Marshal, Pipeline failure investigation report SFM #277, March 4, 2005. http://osfm.fire.ca.gov/pipeline/pdf/WCFinalReport/WalnutCreekFinalReport.pdf. Photo: OSFM.

[6] Occupational Safety and Health Appeals Board. Decision after reconsideration. Dockets 09-R4D5-0459 and 0460. November 9, 2012. http://www.dir.ca.gov/oshab/decisions/09-R4D5-0459_and_0460.pdf#zoom=100

Fresno, Friday, April 17, 2015:[7,8] Fresno County was re-establishing access roads and building access ramps to an existing access road behind the Fresno County Sheriff's Foundation shooting range along Highway 99. The operator of a front loader struck the PG&E's Line 118-B, a 10-inch high pressure natural gas pipeline, causing an explosion that injured the operator and 12 others working in the vicinity. The operator suffered burns on 35% of his body and was hospitalized for 53 days. One of the nearby workers would die from his injuries.

No call to 811 or to PG&E had been made. Line 118-B sloped down the hillside at an angle of 20˚, a slope into which the front loader had been cutting.

Bakersfield, Friday, November 13, 2015: [9,10]As the Department of Industrial Relations Division of Occupational Safety and Health (Cal/OSHA) and California Public Utilities Commission investigations are ongoing, few details have been released about the most recent accident. Big and Deep Agricultural Development had notified the regional notification center of proposed excavation in October. The company was "ripping" in preparation for orchard planting, using a shank that dug as much as six feet below the surface. The "ticket" obtained by Big and Deep, valid for 28 days pursuant to state law, had expired on November 5, though the company has indicated in media reports that PG&E's markings indicating the presence of Line 300-A were still visible.

On November 13 the machine operator engaged in ripping struck Line 300-A, causing the line to rupture and the gas to explode, killing the operator and seriously burning two women in a nearby house.

---

[7] https://assets.documentcloud.org/documents/2490125/co2-fresno-county-public-works-dept-1056896.pdf

[8] http://www.cpuc.ca.gov/NR/rdonlyres/A5C3630F-83A3-4326-A35C-2FAF4E0E8C90/0/1502991FresnoRuptureReport.pdf. Photo: Exponent.

[9] http://www.bakersfield.com/news/2015/12/07/pg-e-files-lawsuit-against-ag-company-in-gasline-explosion.html

[10] Complaint, *Pacific Gas and Electric Company v. Jeff Alexander*, Superior Court of the State of California, County of Kern, December 7, 2015. Photo: PG&E.

State law enacted after the Walnut Creek accident requires that excavation within 10 feet of a high pressure line such as Line 300-A requires an onsite meeting at a mutually agreed upon time. The law does not specify whose responsibility it is to ensure the meeting happens.

PG&E, citing other, additional violations on the part of Big and Deep, requested Kern County Superior Court grant an injunction against the company to prevent it from operating without a PG&E representative onsite. A temporary injunction has been granted in advance of a December 22 hearing.

Bakersfield: A Crossroads

Kern County's geographically central location, as well as the prevalence of its oil industry, makes Bakersfield a hub of energy transportation by pipeline. Gathering lines lightly regulated by the Division of Oil, Gas, and Geothermal Resources (DOGGR) take petroleum products from wells to processing facilities. Petroleum transmission pipelines bring crude oil from the southern San Joaquin Valley and from offshore wells to Bakersfield for refining and through the region to the Los Angeles Basin. Two of PG&E's largest natural gas backbone transmission lines—Lines 300-A and 300-B—pass just south of Bakersfield on their way from Arizona to the Bay Area. The presence of these pipelines, combined with a vibrant agricultural sector whose business is to manipulate soil, pose hazards to health and safety that may be greater than in other parts of the state.

The region has had its share of near-misses before the November 13 disaster.

- **Friday, October 24, 2014**: An employee of the same project management company involved in the November 13 accident struck the same PG&E pipeline in the same area, causing a rupture that evacuated nearby schools and led the Kern County Fire Department to create an 8-square mile exclusion zone.[11] The gas did not ignite, and no one was hurt. The CPUC indicated that it has made a preliminary determination that "PG&E failed to mark the pipeline's location, as requested by the digging party, and also failed to follow its procedures and have a standby person on-site during the excavation process to locate the pipeline, as requested by the digging party," but did not say whether the excavator—who is not subject to CPUC jurisdiction—was also in violation of state law or indicate the probable cause of the accident.[12]

[11] John Cox, "State investigators faulted PG&E after 2014 accident similar to last week's gas explosion," *Bakersfield Californian*, November 17, 2015. http://www.bakersfield.com/news/2015/11/17/state-investigators-faulted-pg-e-after-2014-accident-similar-to-last-week-s-gas-line-explosion.html

Courtenay Edelhart and Christine L. Peterson, "Gas line rupture a reminder: call before you dig," *Bakersfield Californian*, October 24, 2014. http://www.bakersfield.com/news/2014/10/24/gas-line-rupture-a-reminder-call-before-you-dig.html

[12] Carol Ferguson, "Gas line explosion: A look at the company behind 'tragic incident'" Bakersfield Now, November 17, 2015. http://bakersfieldnow.com/news/local/gas-line-explosion-a-look-at-the-company-behind-tragic-accident

- **March 11, 2014**: A Southern California Gas employee performing a routine leak survey near the homes of Nelson Court in Arvin discovered a gas leak coming from a pipe that was not theirs.[13] DOGGR contacted Petro Capital Resources, who had leases in the vicinity, and the source of the leak was found in a flare pipe several days later. Kern County found that flammable gasses were half of the lower explosive limit in eight homes, and the soil was saturated with natural gas to the point that vapor extraction was needed.[14] Excavation was not implicated. This year the Legislature passed and the Governor signed AB 1420 (Salas), which increased operator oversight responsibility of DOGGR-regulated oil and gas production pipelines.

- **April 22, 2013:** A pavement recycling vehicle hit a 3-inch natural gas riser at Alta Vista Drive near Linden Avenue in Bakersfield, causing an explosion that engulfed the vehicle in flames. The equipment operator jumped from the vehicle and was unharmed. The roadwork had been delayed for several months so that utility companies could lower their facilities before work. The riser appeared to be 3 inches below the surface. A call to 811 had occurred.[15]

- **October 24, 2011:** A longitudinal weld in PG&E's Line 300-B failed a pressure test in an alfalfa field near the town of Weedpatch. This was a test using water, and excavation was not implicated.[16]

National Perspective

Nationwide fatality data[17] is consistent with the finding that failure to call 811 is only one factor leading to disaster. Of the ten fatal accidents since 2010 involving gas distribution infrastructure, only 2 were the result of a failure to call 811. In gas distribution accidents, the most common reason that accident leads to disaster is the failure of either excavators or utility personnel to recognize the gravity of a damage and evacuate homes and businesses before they explode. Few gas distribution leaks—whether caused by excavation or not—are of sufficient pressure to explode immediately, but the gas takes time to travel along pipes into homes, where it can collect in an enclosed space until reaching a sufficient concentration to allow combustion. In one 2012 accident in Topeka, Kansas, the contractor who caused the gas leak called the utility and waited on hold for 17 minutes before calling the one-call center, where he received an automated message to call the utility directly. The contractor called an emergency utility

[13] Ruth Brown, "Arvin gas leak reveals lack of oversight," *Bakersfield Californian*, April 26, 2014. http://www.bakersfield.com/news/2014/04/27/arvin-gas-leak-reveals-lack-of-oversight.html

[14] Senate Environmental Quality Committee analysis of AB 1420, July 7, 2015. http://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?bill_id=201520160AB1420#

[15] Todd Bloomstine, testimony, June 4, 2013. http://seuc.senate.ca.gov/sites/seuc.senate.ca.gov/files/6-4-13Bloomstine.pdf

[16] Jaxon Van Derbeken, "Major PG&E gas line ruptures during hydrotest," *San Francisco Chronicle*, October 24, 2015. http://www.sfgate.com/news/article/Major-PG-E-gas-line-ruptures-during-hydro-test-2325437.php

[17] http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends

line, and when the utility representative finally arrived—53 minutes after the initial damage—the representative called for a work crew. After 90 minutes, the residence two houses down from the damaged gas line exploded. At no time was 911 called or residences evacuated. Failure in response to leaks is not peculiar to excavation damage: the response to this instance is similar to that which occurred with the fatal Rancho Cordova explosion in 2008.[18] In Rancho Cordova, faulty installation was the cause of the leak.

Any strike to a high pressure transmission natural gas or petroleum pipe can be disastrous immediately. In Texas in 2010 an electric utility crew boring to install an electric pole hit a 36-inch petroleum pipe, causing an explosion that left one dead and six injured. The pipeline wasn't marked, as the locator had difficulty finding it, and poor communication from the locator to the excavator turned the situation from a delay and inconvenience to a disaster.[19]

Notification to the 811 service by an excavator is just one element of a larger approach to safety: effective communication between excavators and utility operators. ***The committees might wish to explore what constitutes effective safety communication, and what barriers may exist to impede that communication.***

Prepared by:

Tony Marino

[18] National Transportation Safety Board, "Explosion, release, and ignition of natural gas: Rancho Cordova, CA," PAB-10/1, May 10, 2010. http://www.ntsb.gov/investigations/AccidentReports/Pages/PAB1001.aspx

[19] National Transportation Safety Board, "Enterprise Products Natural Gas Pipeline Excavation Damage, Rupture, and Fire: Cleburne, TX," PAB-13/2, September 9, 2013. http://www.ntsb.gov/investigations/AccidentReports/Pages/PAB1302.aspx